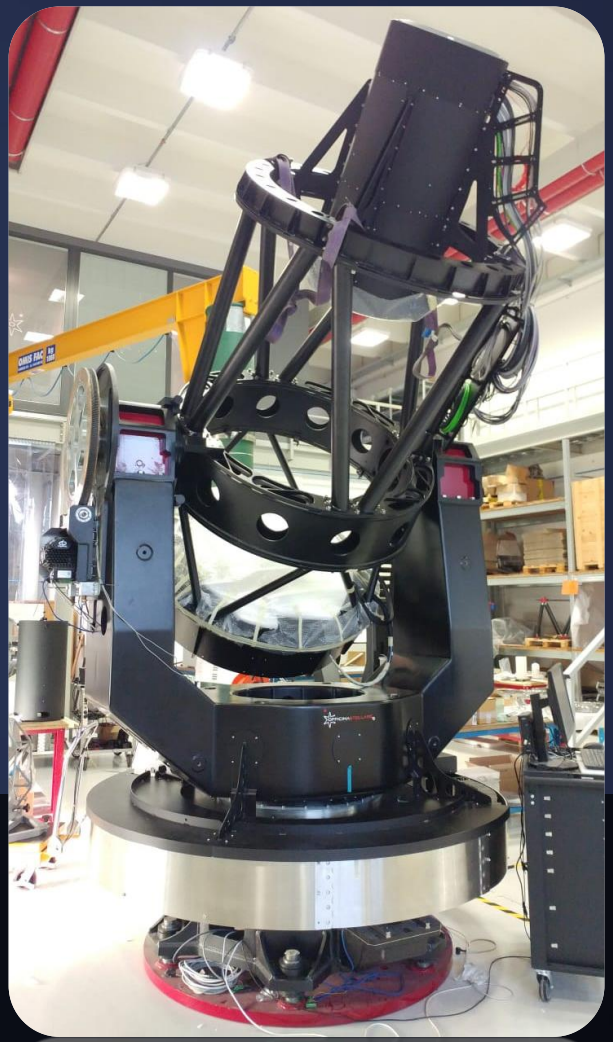
The telescopes network for NEO surveillance of the GAL Hassin Astronomical Center



Alessandro Nastasi

GAL Hassin – Centro Internazionale per le Scienze Astronomiche

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Centro Internazionale per le Scienze Astronomiche Isnello

IAWN Steering Committee Meeting – 23 September 2020

The GAL Hassin Astronomical Center

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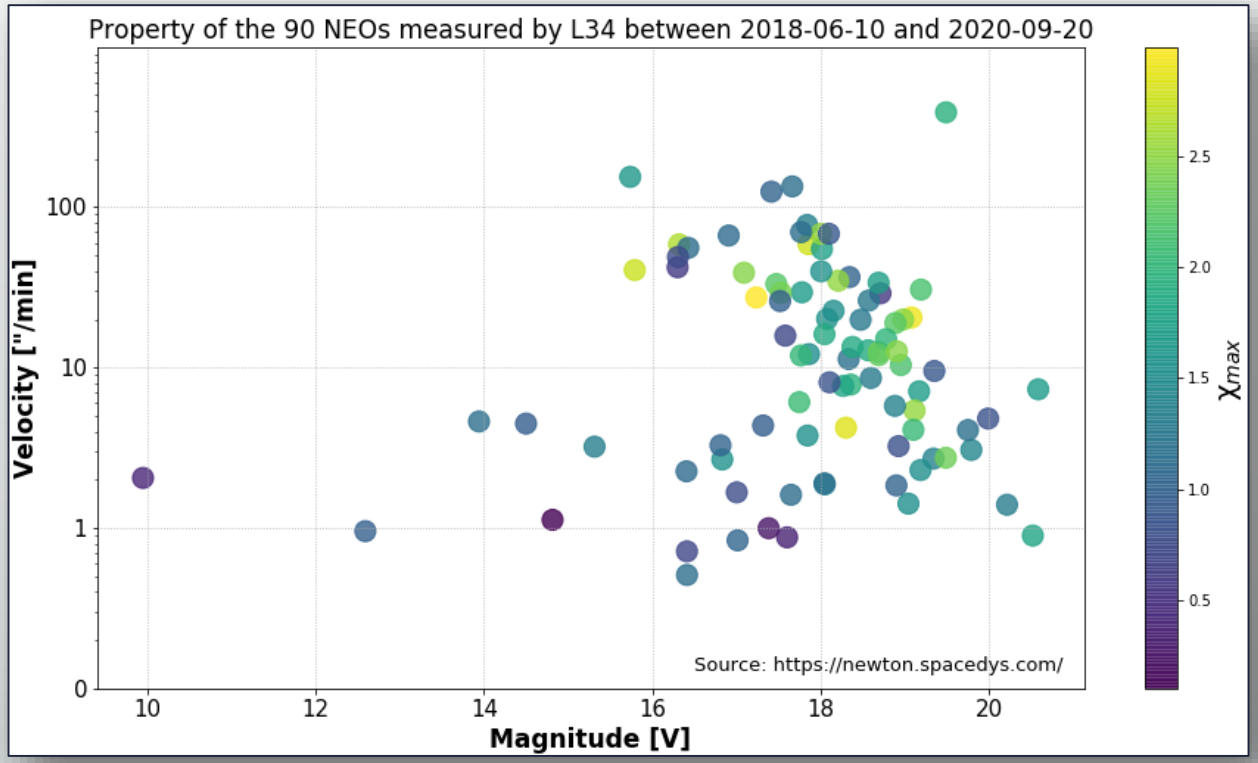

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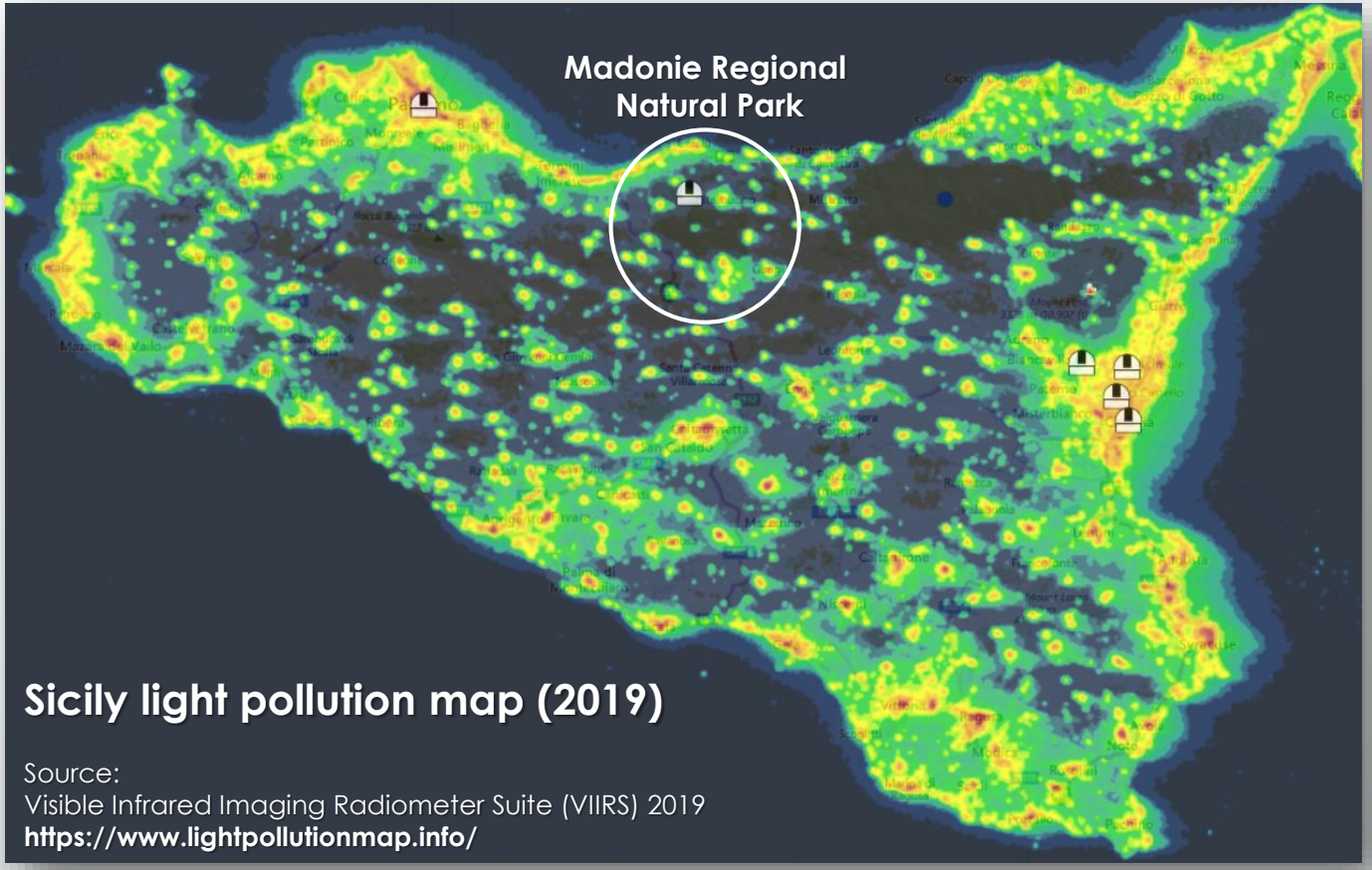
The Madonie Regional Park sky conditions

- Low latitude site (~38°): access to sky targets down to **DEC ~ -35°**
- Exceptionally **low night sky brightness** (~ 21.5 mag/arsec^2)



Sicily light pollution map (2019)

Source:
Visible Infrared Imaging Radiometer Suite (VIIRS) 2019
https://www.lightpollutionmap.info/

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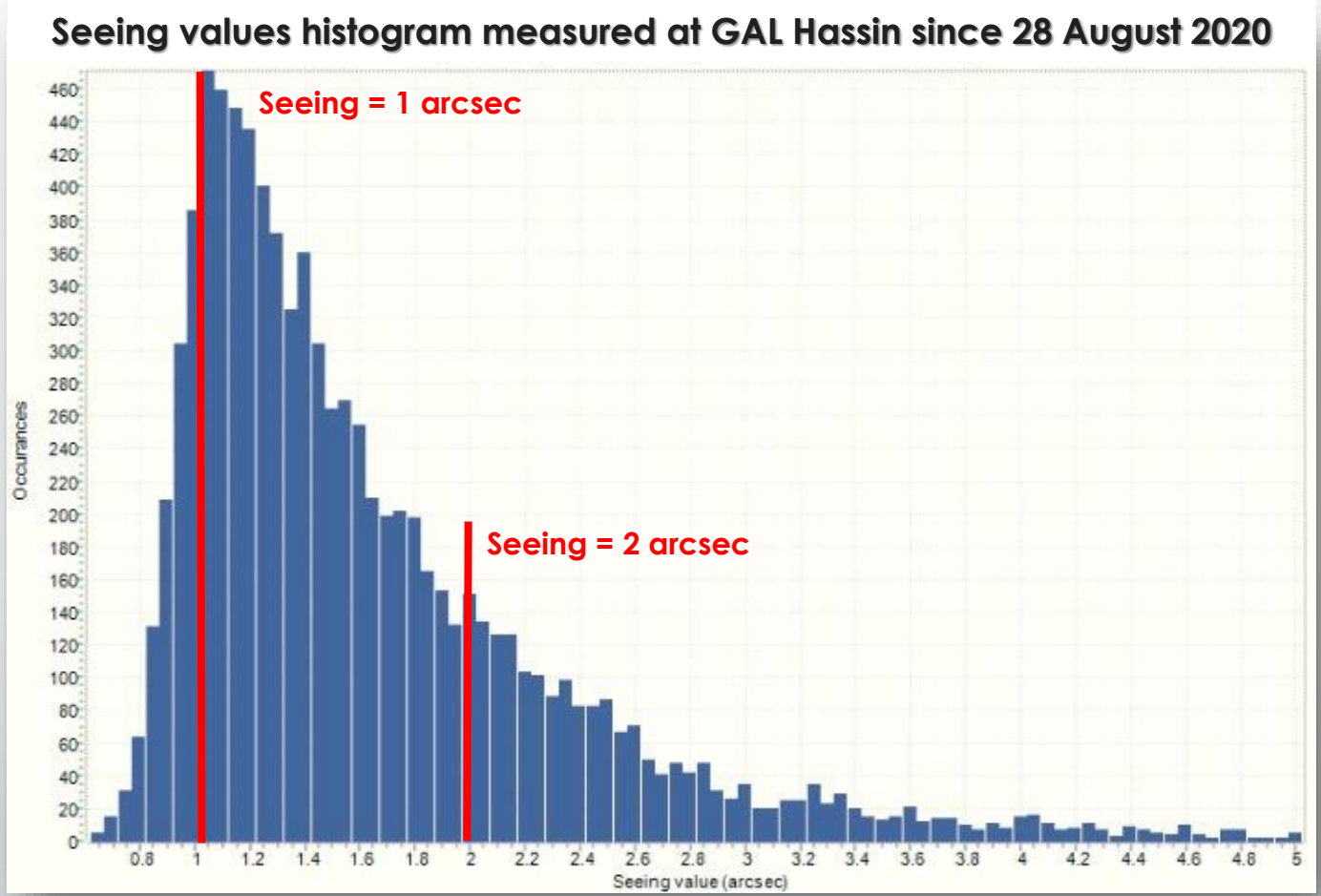
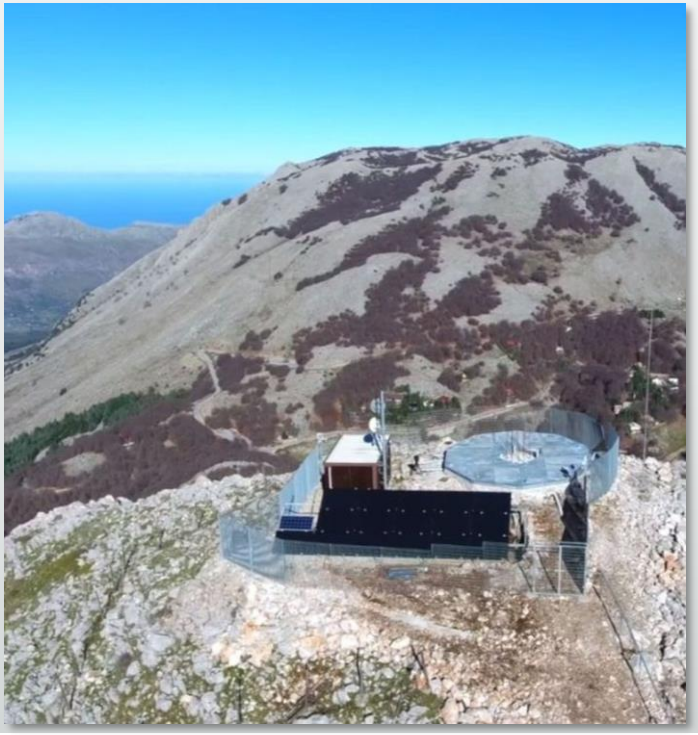
The Madonie Regional Park sky conditions

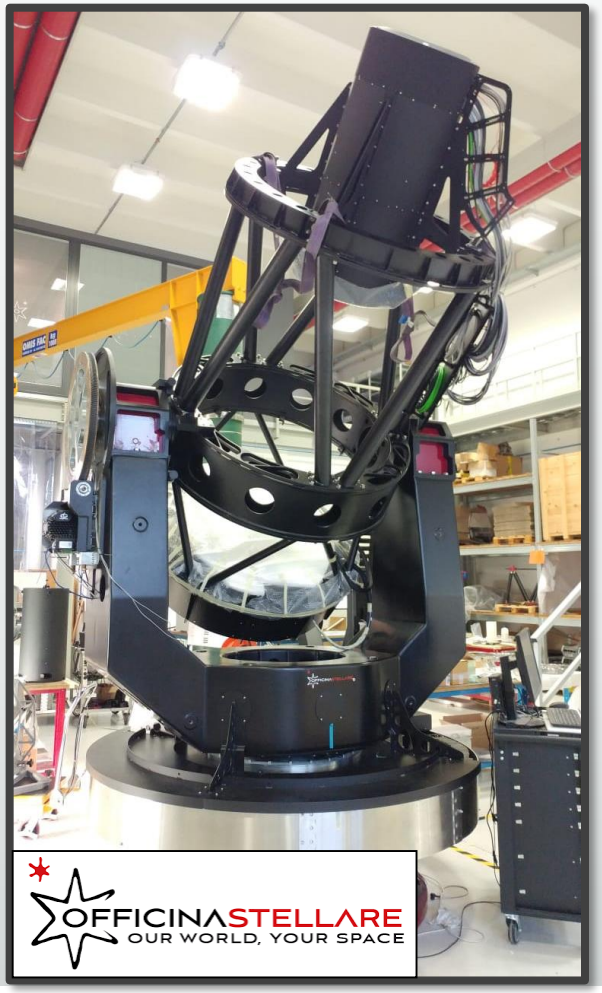
- Low latitude site (~38°): access to sky targets down to **DEC ~ -35°**
- Exceptionally **low night sky brightness** (~ 21.5 mag/arsec^2)
- Typical **seeing ~ 1 arcsec**



The upcoming Wide field Mufara Telescope (WMT)

A new corrected wide field (**6.3 deg^2**), fast (**f2.1**), **1-m** class telescope currently under construction on Mount Mufara (1865 m), 10 km away from the GAL Hassin center.





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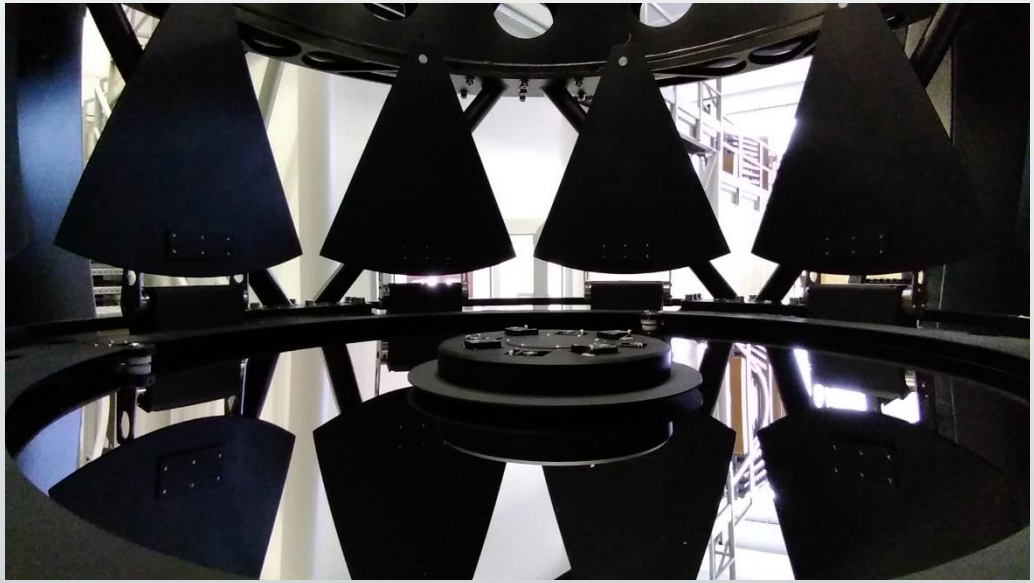
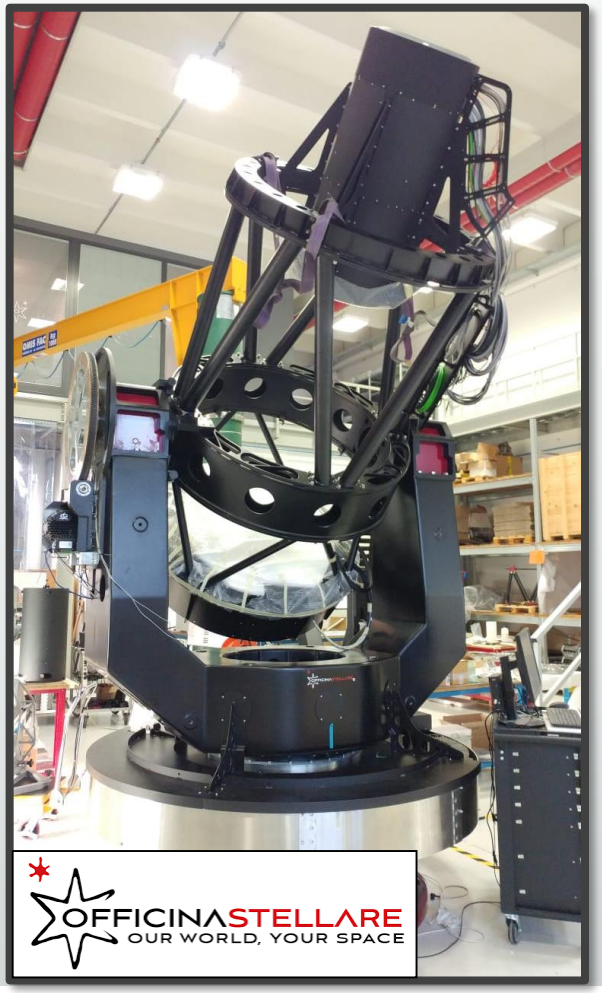
A new corrected wide field (**6.3 deg^2**), fast (**f2.1**), **1-m** class telescope currently under construction on Mount Mufara (1865 m), 10 km away from the GAL Hassin center.

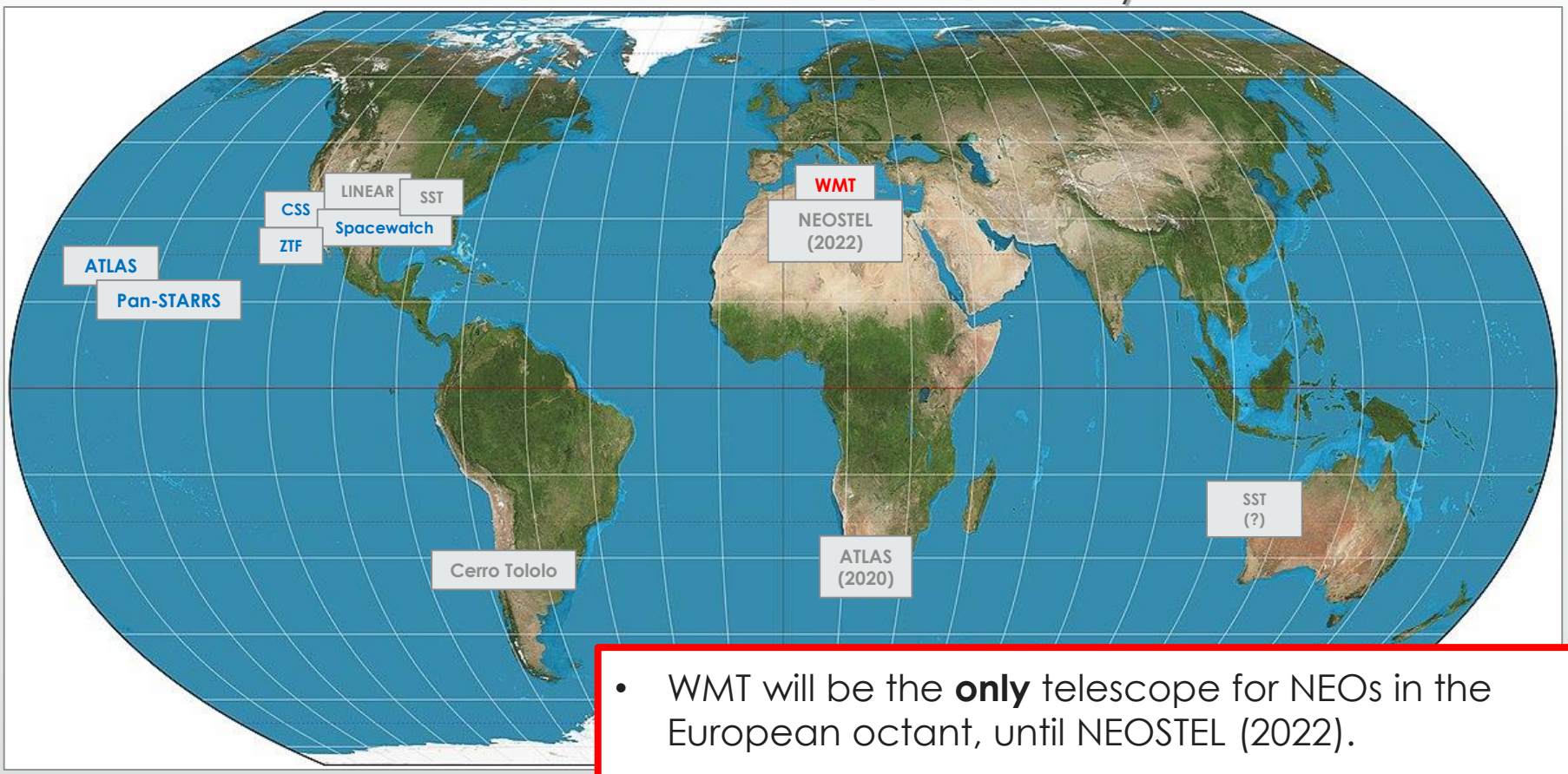
- **Prime focus** configuration with corrective lenses, and a **9k x 9k**, 10μm pixels low noise CCD camera (scale: **1''/px**)
- Equipped with the Sloan (**g'**, **r'**, **i'**,**z'**) filters set
- Reaching magnitude **r'~21 with 60s** exposure





The upcoming Wide field Mufara Telescope (WMT)

The contribution to the NEOs survey



- WMT will be the **only** telescope for NEOs in the European octant, until NEOSTEL (2022).
- **8 hours ahead** w.r.t. the American surveys: crucial for early alert – see *2008 TC3, 2014 AA, 2018 LA*

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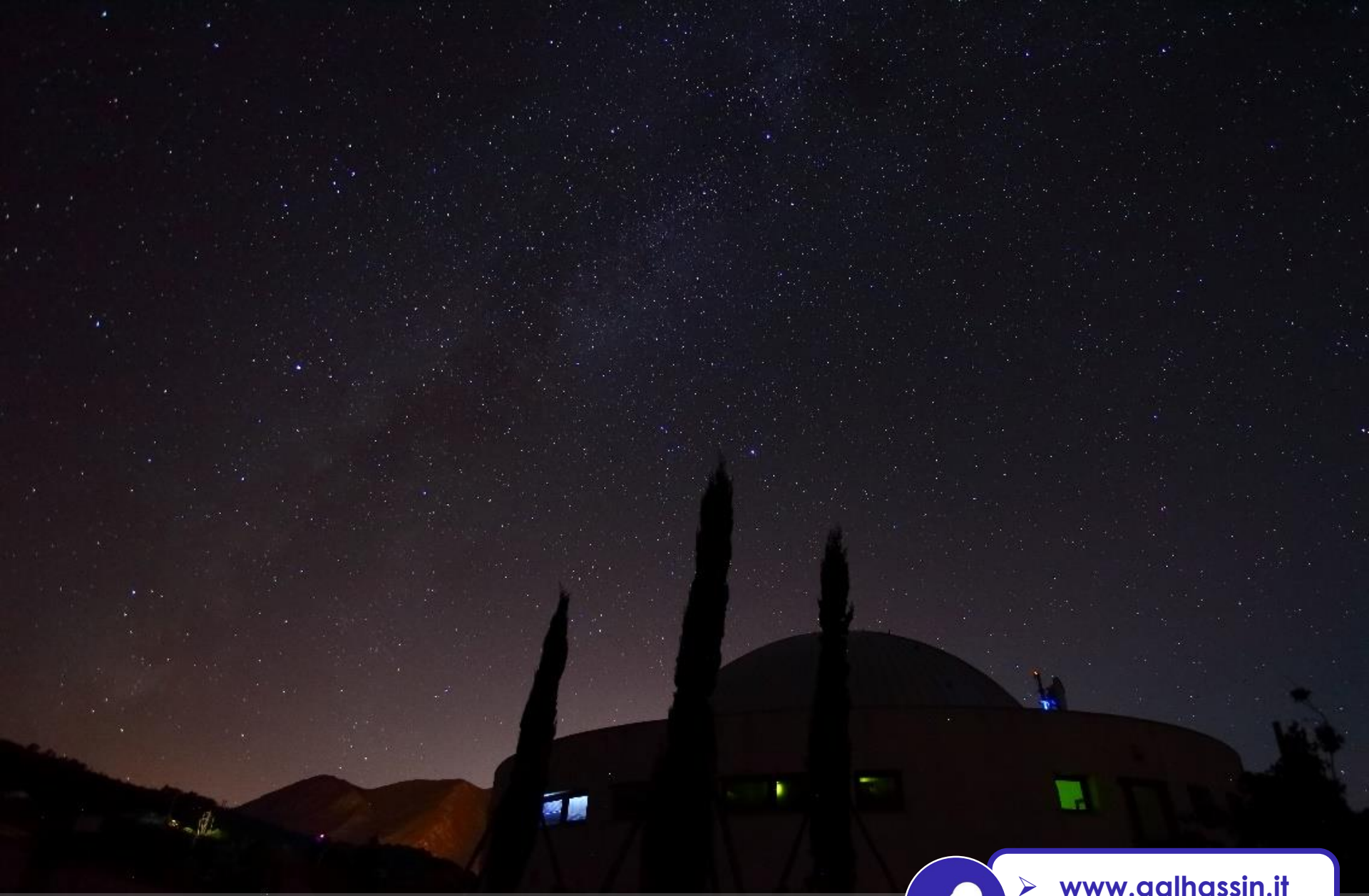
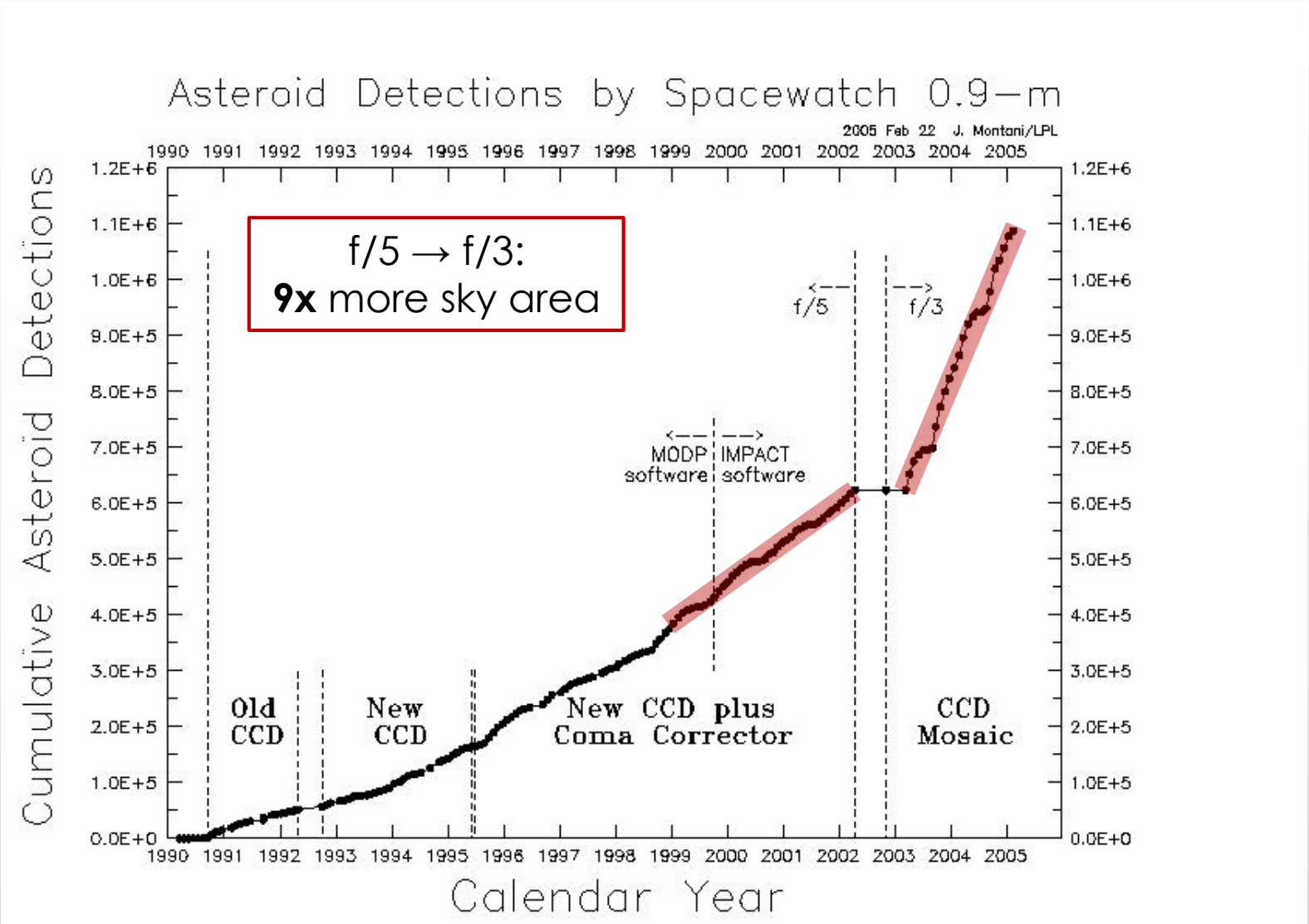


Thank you

- www.galhassin.it
- info@galhassin.it

BACKUP

The importance of 'fast' telescopes for NEA detection



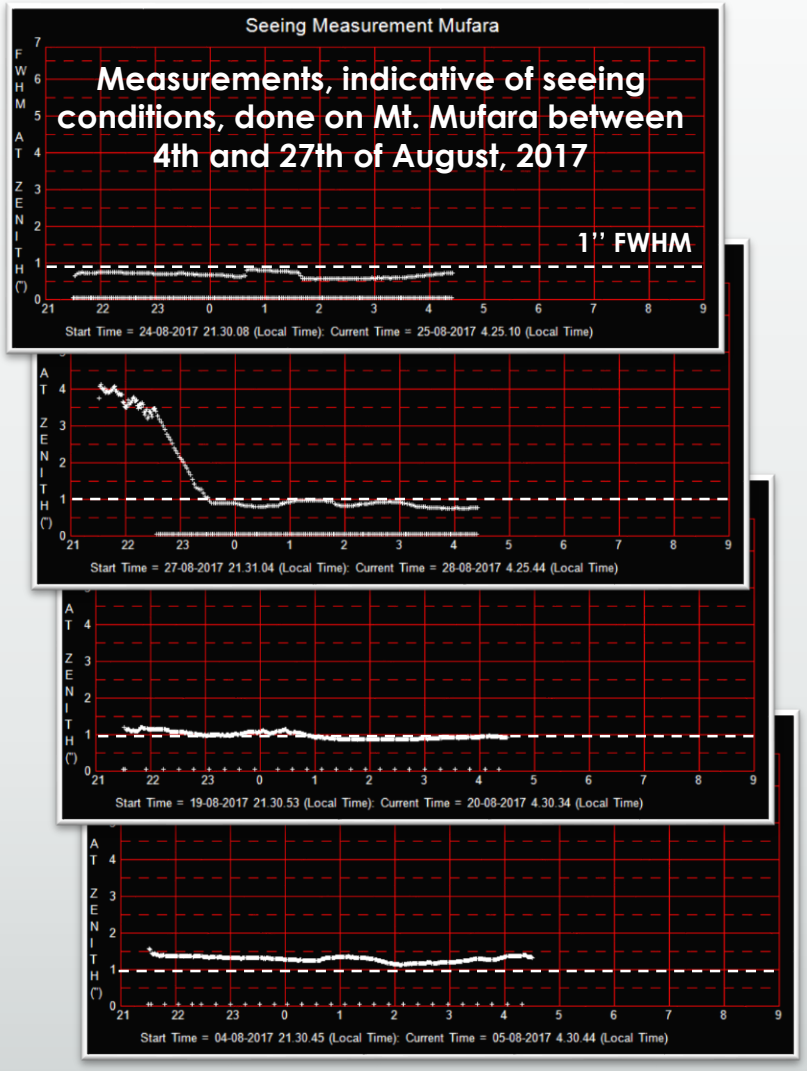
Observatory/ Survey	MPC Code	Tel. aperture [m]	f Number	FoV [deg^2]	CCD [Mpx]	Lim Mag [H]	Time Zone	Latitude
WMT	**-**	**1**	**f/2.1**	**6.3**	**81**	**t.b.c. ~22 (r')**	**UTC+1**	**38°**
Catalina Sky Survey (**CSS**)	703 I52 G96	0.7 1.0 1.5	f/1.8 f/2.6 f/1.6	19.4 0.3 5	111 4 111	19.5 22 21.5	UTC-7	32°
ATLAS	T05, T08	0.5	f/2	29	111	19	UTC -10	20°
Spacewatch	691 291	0.9 1.8	f/3 f/2.7	2.9 3.8	37 4	21.7 (R) 22 (R)	UTC-7	32°
Pan-STARRS	F51, F52	1.8	f/4.4	7	1400	22	UTC -10	20°
Zwicky Transient Facility (**ZTF**)	I41	1.2	f/2.5	47	576	20.4	UTC-8	33°
Lincoln Laboratory ETS (**LINEAR**)	704	1	f/2.2	2	5	20.5	UTC-7	33°
Space Surveillance Telescope (**SST**)	G45	3.5	f/1	5	100	20.5	UTC-7 UTC+8	33° -21° (?)
Cerro Tololo Inter-American Observatory	W84	4	f/2.9	2.2	520	24 (z)	UTC-3	-30°

The GAL Hassin telescope facilities:

- **The Wide Field Mufara Telescope (WMT)**

Night sky conditions on Mt. Mufara:

- 1/3 of photometric nights, with seeing of ~1'' for more than 6hrs per night;
- 1/3 of quasi-photometric nights;
- 1/3 not clear nights.



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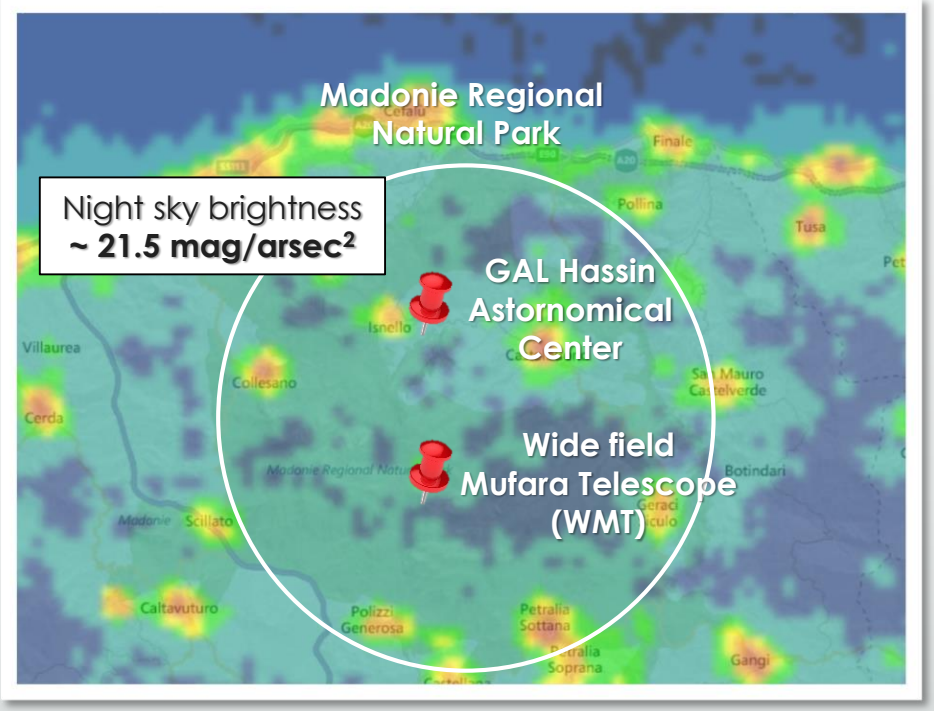
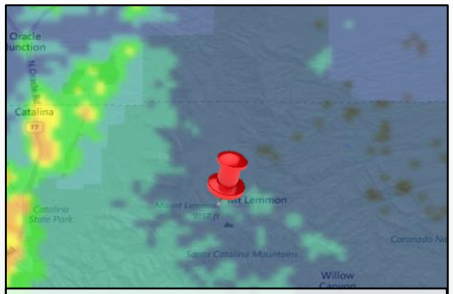
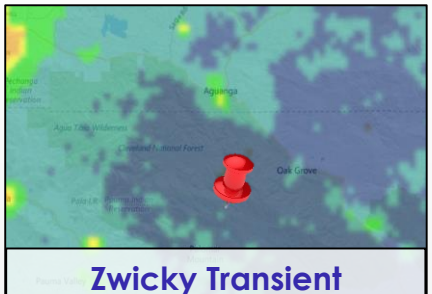
The astronomical site

- Exceptional night sky conditions, well known since the '70s.

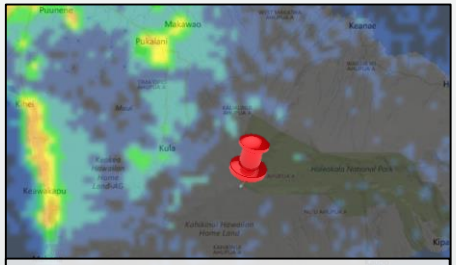




Catalina Station
(32.44275, -110.788719)
~ 21.4 mag/arsec²



Zwicky Transient Facility (ZTF)
(33.357306, -116.86)
~ 21.5 mag/arsec²



Haleakala Observatory
(20.707233, -156.255911)
~ 21.9 mag/arsec²

Cerro Paranal
(-24.626906, -70.404146)
~ 22.0 mag/arsec²

Some of the darkest places in the world, for comparison.

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Source:
Visible Infrared Imaging Radiometer Suite (VIIRS) 2019
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